

**Study Guide**

For use with pages 398–402

**GOAL** Use  $x$ - and  $y$ -intercepts to graph linear equations.**VOCABULARY**

The  $x$ -coordinate of a point where a graph crosses the  $x$ -axis is an  **$x$ -intercept**.

The  $y$ -coordinate of a point where a graph crosses the  $y$ -axis is a  **$y$ -intercept**.

**EXAMPLE 1** Finding Intercepts of a GraphFind the intercepts of the graph of  $5x + 9y = 45$ .**Solution**To find the  $x$ -intercept, let  $y = 0$  and solve for  $x$ .

$$5x + 9y = 45 \quad \text{Write original equation.}$$

$$5x + 9(0) = 45 \quad \text{Substitute 0 for } y.$$

$$5x = 45 \quad \text{Simplify.}$$

$$x = 9 \quad \text{Divide each side by 5.}$$

To find the  $y$ -intercept, let  $x = 0$  and solve for  $y$ .

$$5x + 9y = 45 \quad \text{Write original equation.}$$

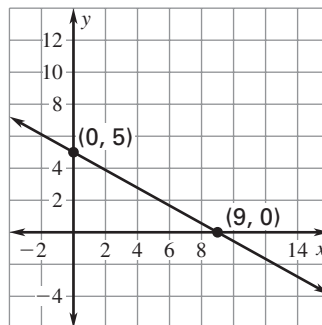
$$5(0) + 9y = 45 \quad \text{Substitute 0 for } x.$$

$$9y = 45 \quad \text{Simplify.}$$

$$y = 5 \quad \text{Divide each side by 9.}$$

**Answer:** The  $x$ -intercept is 9, and the  $y$ -intercept is 5.**EXAMPLE 2** Using Intercepts to Graph a Linear EquationGraph the equation  $5x + 9y = 45$  from Example 1.The  $x$ -intercept is 9, so plot the point  $(9, 0)$ .The  $y$ -intercept is 5, so plot the point  $(0, 5)$ .

Draw a line through the two points.

**Exercises for Examples 1 and 2**

Find the intercepts of the equation's graph. Then graph the equation.

1.  $y = 3x + 6$

2.  $5x - 3y = 45$

3.  $\frac{2}{3}x + y = 4$

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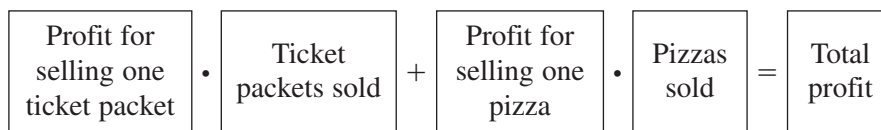
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**EXAMPLE 3 Writing and Graphing an Equation**

For a school fund-raiser, you are selling movie tickets and pizzas. You earn \$6 for each packet of movie tickets you sell and \$3 for each pizza you sell. You want to raise \$300. Write and graph an equation describing your possible sales. Give three possible combinations of ticket packets and pizzas sold.

**Solution**

- (1) To write an equation, let  $x$  be the number of movie ticket packets you sell and let  $y$  be the number of pizzas you sell. First write a verbal model.



Then use the verbal model to write the equation.

$$6x + 3y = 300$$

- (2) To graph the equation, find and use the intercepts.

**Find x-intercept:**  $6x + 3y = 300$

$$6x + 3(0) = 300$$

$$6x = 300$$

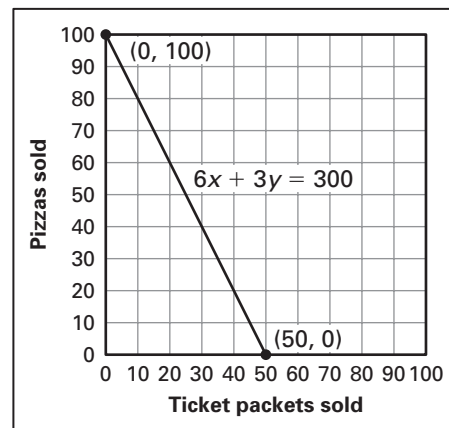
$$x = 50$$

**Find y-intercept:**  $6x + 3y = 300$

$$6(0) + 3y = 300$$

$$3y = 300$$

$$y = 100$$



- (3) Three points on the graph are (0, 100), (30, 40), and (50, 0). So, you can not sell any ticket packets and sell 100 pizzas, or sell 30 ticket packets and 40 pizzas, or sell 50 ticket packets and not sell any pizzas.

**Exercise for Example 3**

4. You plan to spend \$100 on DVDs and videos. DVDs cost \$20 and videos cost \$10. Write an equation describing the possible number of DVDs  $x$  and videos  $y$  you can buy. Then use intercepts to graph the equation. Finally, give three possible combinations of DVDs and videos you can buy.